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(54) **Method for the production of a drawer for the load of washing and/or rinsing products, particularly for a washing machine**

(57) Method for the production of a drawer (1) for the load of washing and/or rinsing products, particularly for a washing machine, this drawer comprising at least one compartment (3) with one or more openings (5) on its bottom, and a tube (6) protruding from the border of each opening (5); the method comprises at least the following steps:

a) injecting a liquefied plastic material in a mould (2) adapted to obtain the drawer and a drip tray (12) connected to the drawer (1) by a connecting element (13) forming a single-piece construction with the drawer (1) and the drip tray (12);

b) after the solidification of the plastic material, opening the mould (2) and extracting the drawer (1) and the drip tray (12);

c) rotating the drip tray (12) towards the bottom of the compartment, and contemporaneously folding the connecting element (13), until positioning the drip tray (12) underneath the one or more openings (5);

d) associating the drip tray (12) to the bottom of the at least one compartment (3).

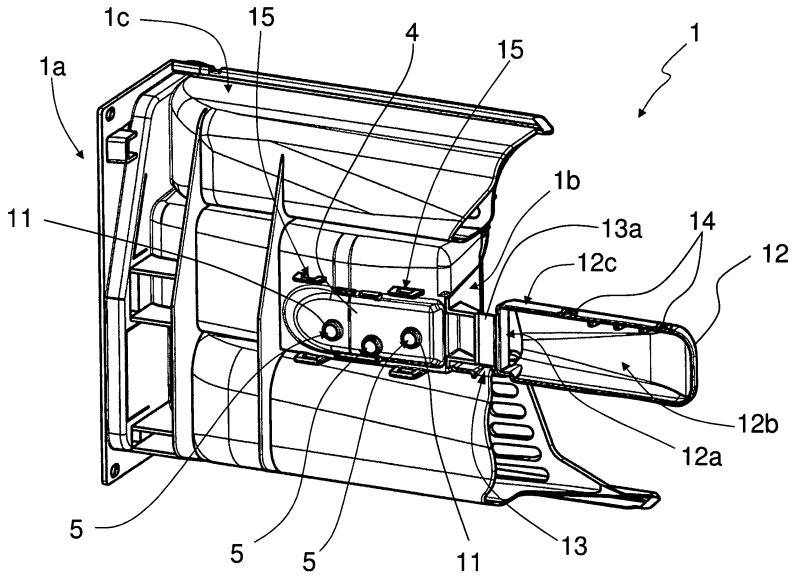

Fig. 9

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Description

[0001] The present invention refers to a method for the production of a drawer for the load of washing and/or rinsing products, particularly for a washing machine.

[0002] Nowadays washing machines, both "simple" washing machines (i.e. washing machines which can only wash and rinse the laundry), and washing-drying machines (i.e. washing machines which can also dry the laundry), usually comprise an external casing provided with a loading/unloading door which allows the access to a washing tub containing a rotary perforated drum in which the laundry to be washed can be loaded.

[0003] Water and washing or rinsing products (i.e. detersives, softeners, bleaching, etc.) are admitted in the tub, and therefore in the rotating drum, by a water supply circuit connected to the water delivery mains present outside the machine; after the washing or rinsing phases, washing or rinsing water is discharged from the tub by a discharge circuit.

[0004] The water supply circuit comprises a first conduit which is fluidly connectable, upstream, to the water delivery mains present outside the washing machine, and which is connected, downstream, to a detergent dispenser adapted to allow the insertion of washing/rinsing products, and in which the water can be mixed with the latter before being introduced in the tub.

[0005] The detergent dispenser is also fluidly connected, downstream, to the tub, in such a way to allow the water, clean, or mixed with washing or rinsing products, to flow into the tub.

[0006] Figure 1 to 7 schematically illustrate a prior-art washing machine 100 provided with a detergent dispenser 101 comprising a hollow housing 102 fixed to the external casing 103 of the washing machine 100; the housing 102 is provided, on its bottom 102a, with a hole 104, fluidly connected, for example via a suitable pipe 105, to the tub 106, of the washing machine 100.

[0007] The housing 102 contains a removable drawer 107, usually provided, at its frontal end 107a, with a suitable handle 108 allowing its extraction from the housing 102.

[0008] In the drawer 107 various compartments are obtained, adapted to be filled with washing and/or rinsing products, for example detersives, softener, bleaching substances, etc.

[0009] In particular there is a compartment 109 adapted to be filled with a liquid softener 110.

[0010] One or more openings 111 are obtained in the bottom 109a of the compartment 109, and a tube 112, substantially cylindrical, protrudes from the border of each of these openings 111, substantially perpendicularly to the bottom 109a; the prior-art drawer 107 illustrated in Figures 1 to 7 comprises only one opening 111, and one tube 112.

[0011] The internal of the compartment 109 fluidly communicates, via the tube 112 and the opening 111, with a drip tray 113 protruding inferiorly and externally from the drawer 107, and opened in correspondence of the rear end 107b of the latter; the bottom of the drip tray 113 is inclined downwards.

[0012] A cover 114 is positioned in the compartment 109, and it is adapted to define, together with the one or more tubes 112, one or more siphons 115, which functioning will be described in the following; this cover 114 is provided with one or more apertures 114a, allowing the passage of water and/or softener.

[0013] A water dispenser 116 is associated to the housing 102 in such a way that it positioned above the drawer 107 when the latter is fully inserted inside the housing 102, as illustrated in Figure 2.

[0014] The water dispenser 116 is fluidly connected, upstream, typically via apposite electromagnetic inlet valves 117, to one or more conduits 118, fluidly connectable to the water delivery mains present outside the washing machine 100; clean water, schematically indicated in Figure 2 with the white arrows numbered 119, after entering the water dispenser 116, can flow into the underlying compartment 109 via one or more suitable passages 120 obtained in the water dispenser 116, in such a way that they are positioned above the compartment 109 when the drawer 107 is fully inserted in the housing 102.

[0015] When a softener 110, typically liquid, is poured in the compartment 109, until its level is lower than the upper edge of the one or more tubes 112, this softener 110 settles in the bottom 109a of the compartment 109.

[0016] When, as indicated in Figure 2, water 119 is admitted in the compartment 109 via the overlying water dispenser 116, this water 119 mixes with the softener 110 present in the compartment 109, and the level of the mixture of water and softener grows, until going beyond the upper edge of the one or more tubes 112 and fully filling the siphon 115.

[0017] From this point, the mixture of water and softener, indicated in Figure 2 by the dotted arrows numbered 121, is sucked by the effect of the siphon 115, and is flown into the drip tray 113, from which it flows, by gravity, into the bottom 102a of the housing 102; from the latter, via the hole 104 the mixture of water and softener flows into the tub 106 of the washing machine 100 via the pipe 105.

[0018] Thanks to the drip tray 113, when the drawer is in the open position, as illustrated in Figures 1 and 3, if too much softener 110 is poured in the compartment 109, and its level trespasses the upper edge of the one or more tubes 112, this softener 110 is prevented from falling outside the detergent dispenser 101, but it is conducted to the bottom 102a of the housing 102 by the drip tray 113.

[0019] The above illustrated drawer 107 of known type is typically obtained by injection moulding of a plastic material; two steps of a known injection moulding procedure for obtaining the drawer 107 are schematically illustrated in the enclosed Figures 4 and 5.

[0020] In Figure 4 it is schematically represented a par-

ticular of a known type mould 122 for the injection moulding of the drawer 107, before the injection of the liquefied plastic material; the mould 122 comprises an upper punch 123, a lower punch 124, and a lateral punch 125, which can be assembled together, like in Figure 4, defining one or more cavities 126 in which a liquefied plastic material can be injected.

[0021] In particular, during the step of the known procedure illustrated in Figure 4, a central region 123a, substantially cylindrical, of the upper punch 123, is in contact with the underlying upper surface 125a of the lateral punch 125, so as to define the opening 111.

[0022] After the injection and the solidification of the plastic material, the punches are moved away one another, so as to allow the extraction of the moulded drawer 107.

[0023] As it is clear from Figures 4 and 5, the lateral punch 125 is necessary for obtaining the moulding of a drip tray 113 protruding from the bottom 109a of the compartment 109, since this punch 125 defines the inner surface of the drip tray 113 and part of the bottom 109a of the compartment 109.

[0024] This known procedure for obtaining the drawer 107 has however a drawback; in fact it is possible that, because of the wear and tear due to the sliding of the upper surface 125a of the lateral punch 124 against the central region 123a of the upper punch 123, one or more backlashes (or clearances) 127, schematically illustrated in Figure 6, could form between such upper surface 125a and central region 123a.

[0025] The presence of these one or more backlashes 127 could cause the leakage of liquefied plastic material in these backlash 127 during the injection of the plastic material, and the consequent formation of featheredges 128, partially or totally occluding the opening 111; in Figure 7 it is schematically illustrated the case in which a featheredge 128 partially occludes the opening 111.

[0026] The aim of the present invention is therefore to obtain a method for producing a drawer for the load of washing and/or rinsing products, particularly for a washing machine, which guarantees the optimal passage of water or of the mixture of water and washing/rinsing products, from the drawer to the tub of a washing machine.

[0027] Within this aim, another object of the invention is to obtain a method for producing a drawer for the load of washing and/or rinsing products, particularly for a washing machine, which doesn't enhance the costs and the time necessary for producing the drawer with respect to the prior art.

[0028] It is therefore an object of the present invention to solve the above-noted problems, thereby doing away with the drawbacks of the cited prior art.

[0029] The Applicant has found that by using a mould adapted to obtain a drawer connected to a drip tray by a connecting element forming a single-piece construction with the drawer and the drip tray, by rotating the drip tray extracted from such a mould towards the bottom of the drawer until positioning the drip tray underneath one or more openings provided in such a bottom, and finally by associating the drip tray to this bottom, it is possible to obtain a drawer for the load of washing and/or rinsing products, particularly for a washing machine, without the use of a lateral punch which could generate, by its sliding, wear and tear in correspondence to the port of the one or more openings, avoiding in this way the formation of featheredges partially or totally occluding these openings.

[0030] In particular, the above-mentioned aim and objects, as well as others that will become better apparent hereinafter, are achieved by a method for the production of a drawer for the load of washing and/or rinsing products, particularly for a washing machine, this drawer comprising at least one compartment with one or more openings on its bottom, and a tube protruding from the border of each opening; the method comprises at least the following steps:

a) injecting a liquefied plastic material in a mould adapted to obtain the drawer and a drip tray connected to the drawer by a connecting element forming a single-piece construction with the drawer and the drip tray;

b) after the solidification of the plastic material, opening the mould and extracting the drawer and the drip tray;

c) rotating the drip tray towards the bottom of the compartment, and contemporaneously folding the connecting element, until positioning the drip tray underneath the one or more openings;

d) associating the drip tray to the bottom of the at least one compartment.

[0031] Opportunely, after the extraction from the mould and before the rotation of the drip tray, the drip tray isn't positioned below the one or more openings of the compartment.

[0032] Advantageously, the compartment has an elongated shape extending substantially along a longitudinal axis connecting a frontal end and a rear end of the drawer; preferably, after the extraction from the mould and before the rotation of the drip tray, the drawer and the drip tray are substantially reciprocally aligned along an axis substantially parallel to the longitudinal axis.

[0033] Opportunely, after the extraction from the mould and before the rotation of the drip tray, the aid connecting element is connected to a rear end of the drip tray, and to a rear end of the drawer.

[0034] Preferably, the association of the drip tray to the bottom of the compartment is obtained by the coupling of first and second fastening means provided respectively at the drip tray and at the bottom of the compartment, during the injection moulding of the drawer and drip tray, by a suitable conformation of the mould.

[0035] Advantageously, the association of the drip tray to the bottom of the compartment is obtained by the snap fittings of the first and second fastening means.

[0036] Opportunely, the association of the drip tray to the bottom of the compartment is obtained by the snap fitting of a plurality of pawls, protruding from the lateral surface of the drip tray, with a plurality of seats obtained in the bottom of the compartment.

[0037] In a further embodiment the association of the drip tray to the bottom of the compartment is obtained by the snap fitting of a plurality of pawls, protruding from the bottom of the compartment, with a plurality of seats obtained in the drip tray.

[0038] Advantageously, the association of the drip tray to the bottom of the compartment is obtained by welding, and/or by glueing, and/or by restraining, and/or by interfering fit.

[0039] Opportunely, the injection of the liquefied plastic material is performed in a mould comprising at least an upper punch and a lower punch, adapted to be assembled together so as to define one or more cavities shaped as said one or more tubes and the corresponding openings, the upper punch comprising, in correspondence of each tube, a central region, substantially cylindrical or conical, defining the internal surface of the tube and the corresponding opening, the central region protruding from the bottom surface of the upper punch, so as to enter, when the upper and lower punches are assembled together, in a corresponding seat, substantially cylindrical, obtained in the lower punch.

[0040] According to another aspect of the invention, it concerns a washing machine comprising a drawer containing at least one compartment, for the load of washing and/or rinsing products, with one or more openings on its bottom and a tube protruding from the border of each opening, a drip tray being positioned underneath the one or more openings; the washing machine comprises a connecting element forming a single-piece construction with the drawer and the drip tray; the connecting element connects the rear end of the drawer and the rear end 12a of the drip tray; the washing machine comprises coupling means, adapted to connect the drip tray to the bottom of the compartment.

[0041] Advantageously, the coupling means comprise first and second fastening means obtained respectively on/at the drip tray and on/at the bottom of the compartment.

[0042] Opportunely, the coupling means comprises glueing and/or welding and/or restraining and/or interfering fit.

[0043] According to another aspect thereof, the invention regards a washing machine comprising a drawer obtained by the above illustrated method.

[0044] Features and advantages of the present invention will anyway be more readily understood from the description that is given below by way of nonlimiting example with reference to the accompanying drawings, in which:

- **Figure 1** is a schematic lateral and partially sectioned view of a prior-art washing machine provided with a prior-art detergent dispenser comprising a drawer for the load of washing and/or rinsing products obtained with the above mentioned known procedure;
- **Figure 2** is a schematic lateral and sectioned view of the prior-art detergent dispenser of Figure 1, with the drawer fully contained in the housing;
- **Figure 3** is a schematic lateral sectioned view of the prior-art detergent dispenser of Figures 1 and 2, with the drawer extracted from the housing;
- **Figure 4** is a schematic lateral sectioned view of a particular of the prior-art mould used in the above described known procedure for obtaining a drawer;
- **Figure 5** is a schematic lateral sectioned view of a particular of the prior-art drawer of Figures 1 to 3 during a step of the above described known production procedure;
- **Figure 6** is a schematic lateral sectioned view of a particular of the upper, lower, and lateral punches of the mould used in the above described known method for producing the drawer, in which can be noticed that the central region of the upper punch is worn;
- **Figure 7** is a schematic lateral sectioned view of a particular of a prior-art drawer produced by the known method described above, in which can be noticed a featheredge partially occluding the opening connecting the tube and the drip tray;
- **Figure 8** is a first prospective view of a drawer for the load of washing and/or rinsing products, according to the invention, during a step of the method for its production according to the invention;
- **Figure 9** is a second prospective view of the drawer of Figure 8;
- **Figure 10** is a prospective view of a drawer for the load of washing and/or rinsing products during a further step of the method for its production according to the invention;
- **Figure 11** is a sectioned view obtained along the plane XI-XI of Figure 8;
- **Figure 12** is a sectioned view obtained along the plane XII-XII of Figure 10;
- **Figure 13** is a schematic lateral sectioned view of a particular of the mould used in the method according to the invention;
- **Figure 14** is a schematic lateral sectioned view of a particular of the drawer of Figures 8 to 13 during a further step of the method according to the invention.

[0045] It is seen therefore how the invention achieves the proposed aim and objects, there being provided a method for the production of a drawer 1 for the load of washing and/or rinsing products, particularly for a washing machine, for example analogous to the prior-art washing machine 100 schematically illustrated above; it is underlined that the invention can be applied for the production of a drawer 1 usable both in a "simple" washing machine (i.e. a washing machine which only washes the laundry), and in a washing and drying machine (i.e.

a washing machine which also dries the laundry).

[0046] Advantageously, the drawer 1 has a frontal end 1a, oriented, when the drawer 1 is associated to a washing machine, towards the external of the latter, and a rear end 1b oriented, when the drawer 1 is associated to a washing machine, towards the internal of the latter.

[0047] Usually the frontal end 1a of the drawer 1 is provided with hanging means, not illustrated, adapted to allow to a user to extract the drawer 1.

[0048] The method according to the invention employs a mould 2 adapted to obtain, by injection moulding of a liquefied plastic material, a drawer 1 comprising at least one compartment 3 on which bottom 4 one or more openings 5 are obtained; a tube 6 (or conduct, or pipe) protrudes from the border of each opening 5, towards the internal of the compartment 3.

[0049] Opportunely the compartment 3 has an elongated shape extending substantially along a longitudinal axis, numbered 20 in Figure 8, connecting the frontal end 1a and the rear end 1b of the drawer 1; advantageously axis 20 also corresponds substantially to the axis of extraction/insertion of the drawer 1 from a suitable casing, not illustrated, provided in a washing machine.

[0050] As schematically illustrated in Figure 13, the mould 2 comprises at least an upper punch 7 and a lower punch 8, adapted to be assembled together so as to define one or more cavities 9, adapted to be filled with a liquefied plastic material, and shaped to form one or more tubes 6 and the corresponding openings 5.

[0051] The upper punch 7 comprises, in correspondence to each tube 6, a central region 7a, substantially cylindrical or conical, defining the internal surface of the tube 6 and the corresponding opening 5; the central region 7a of the upper punch 7, preferably cylindrical, or conical, or prismatic, protrudes from the bottom surface 7b of the upper punch 7, so as to enter, when the upper and the lower punches are assembled together, in a corresponding seat 10, substantially cylindrical or prismatic, obtained in the lower punch 8.

[0052] As can be clearly seen in Figures 13 and 14, during the assembly and the separation of the upper and lower punches, only a little portion of the lateral surface of the central region 7a of the upper punch 7 slides against the lateral surface of the seat 10, while the lower base 7c of the central region 7a engages the bottom 10a of the seat 10 without reciprocal sliding.

[0053] Therefore, a backlash (or clearance) could be generated by wear and tear only between the lateral surface of the central region 7a and the lateral surface of the seat 10, and, consequently, featheredges 11 could develop only along a direction substantially perpendicular to the bottom 4 of the compartment 3, while no featheredges can develop radially to the opening 5 (which, on the contrary, happens in the prior art procedure described above).

[0054] Advantageously, the mould 2 is adapted to obtain, contemporaneously to the drawer 1, a drip tray 12 and a connecting element 13 which, at least immediately after the extraction from the mould 2, connects the drip tray 12 to the drawer 1.

[0055] Opportunely, mould 2 is arranged in such a way that the drawer 1, the drip tray 12 and the connecting element 13, once extracted from such a mould 2, after the injection and the solidification of a liquefied plastic material, form a single-piece construction; in other words, when the drawer 1, the drip tray 12 and the connecting element 13 are extracted from the mould 2, after the injection and the solidification of a liquefied plastic material, they are connected each other so as to define a single body.

[0056] Opportunely, after their extraction from the mould 2 the drawer 1, the drip tray 12 and the connecting element 13 are arranged in such a way that the drip tray 12 isn't positioned below the openings 5 of the compartment 3.

[0057] In other words, the mould 2 is arranged in such a way that the drawer 1, the drip tray 12 and the connecting element 13, extracted from the mould 2 after the injection and the solidification of a liquefied plastic material, are reciprocally positioned in such a way that the drip tray 12 isn't positioned below the openings 5 of the compartment 3 (this means, for example, that a liquid which would exit these openings in this condition, wouldn't enter the drip tray 12).

[0058] For example, with reference to the embodiment illustrated in the enclosed Figures, the mould 2 is configured in such a way that when the drawer 1 and a drip tray 12 are extracted from the mould 2 after the injection and the solidification of a liquefied plastic material, such drawer 1 and drip tray 12, connected by the connecting element 13, are substantially reciprocally aligned along an axis substantially parallel to the above defined longitudinal axis 20 of the compartment 3.

[0059] In a further embodiment, not illustrated, immediately after its extraction from the mould 2, the drip tray 12 can be positioned skewed with respect to the drawer 12; in other words, in this further embodiment, the drip tray 12 is moulded in such a way that it is inclined with respect to the drawer 1. It is clear that also in this further embodiment the drip tray 12, even if skewed with respect to the drawer 1, immediately after its extraction from the mould 2 isn't positioned below the openings 5 of the compartment 3.

[0060] Advantageously, in the embodiment illustrated in the enclosed figures, the connecting element 13 is connected to a rear end 12a of the drip tray 12, and to the rear end 1b of the drawer 1.

[0061] Advantageously, the rear end 12a of the drip tray 12 is opened.

[0062] In another embodiment, not illustrated, the drip tray 12 can be connected to the drawer 1 by a connecting element 13 forming a single-piece construction with such drawer 1 and drip tray 12, and connecting a lateral end of the drawer 1, for example the one numbered 1c in the enclosed figures, with a lateral end of the drip tray 12, for example the one numbered 12c in the enclosed fig-

ures.

[0063] Differently from the above described prior art, the method according to the invention allows avoiding the use of a lateral punch which slides against the bottom of the upper punch 7, and therefore avoids the risk of creating featheredges which could partially or totally occlude the openings 5; in fact, since at least during and immediately after the moulding, the drip tray 12 doesn't protrude from the bottom 4 of the compartment 3, it is not necessary to use a sliding lateral punch which slides against the lower base 7c of the central region 7a of the upper punch 7, and which could generate wear and tear, and therefore backlashes (i.e. clearances), in correspondence of the one or more openings 5.

[0064] As illustrated above, the method according to the invention provides therefore the injection of a liquefied plastic material in the mould 2, and, after the solidification of this plastic material, the opening of the mould 2 and the extraction of the drawer 1 connected to the drip tray 12 by the connecting element 13.

[0065] The method according to the invention further comprises the step of rotating the drip tray 12, by folding the connecting element 13, towards the bottom 4 of the compartment 3, until positioning the drip tray 12 underneath the one or more openings 5.

[0066] Advantageously the connecting element 13 comprises at least a weakened portion, indicated with the reference number 13a, adapted to facilitate the folding of the connecting element 13 during the rotation of the drip tray 12 with respect to the drawer 1.

[0067] According to the invention, it is possible that, during or after the rotation of the drip tray 12, the connecting element 13 would fold and would remain integer, connecting in this way the drawer 1 and drip tray 12 even after the rotation of the latter; according to the invention it is also possible that, during or after the rotation of the drip tray 12, the connecting element 13 would break, in such a way that, after the rotation, the drawer 1 and the drip tray 12 would be no more a single-piece construction.

[0068] After the drip tray 12 has been rotated and positioned underneath the one or more openings 5, (as illustrated for example in Figures 10 and 12), the rear end 12a of the drip tray 12 is positioned substantially in correspondence to the rear end 1b of the drawer 1, and the bottom 12b of the drip tray 12 is inclined in such a way that a liquid is flown by gravity towards the rear end 12a of the drip tray 12; since, as indicated above, the rear end 12a of the drip tray 12 is opened, this fluid can exit the drip tray 12 across the rear end 12a.

[0069] Finally, the method according to the invention proceeds by associating the drip tray 12 to the bottom 4 of the compartment 3.

[0070] Advantageously, the association of the drip tray 12 to the bottom 4 of the compartment 3 is obtained by suitable coupling means comprising, for example, first fastening means and second fastening means, obtained respectively on/at the drip tray 12 and on/at the bottom 4, during the injection moulding of these components, by a suitable arrangement of the mould 2.

[0071] In the embodiment illustrated in Figure 8 to 14, the fist fastening means advantageously comprises a plurality of pawls 14, protruding from the lateral surface of the drip tray 12, and adapted to be fastened, opportunely by snap fitting, to as many seats 15 obtained in the bottom 4 of the compartment 3, when the drip tray 12 is rotated against the bottom 4.

[0072] In another embodiment, not illustrated, one or more pawls protrude from the bottom 4 of the compartment 3, and the corresponding seats are obtained in the drip tray 12.

[0073] In a further embodiment, not illustrated, the coupling means comprise advantageously glueing, and/or welding, and/or restraining, and/or interfering fit.

[0074] A cover 16 is then positioned in the compartment 3 of the drawer 1 obtained with the method according to the invention; this cover 16 is adapted to define, together with the one or more tubes 6, one or more siphons 17, adapted to suck the water or the mixture of water and washing/rinsing product contained in the compartment 3, and to flow it into the drip tray 12 when, by admitting water in the compartment 3, the level of the mixture grows up until fully filling the siphons 17.

[0075] The water or the mixture of water and washing/rinsing product, sucked by the one or more siphons 17, is then flown into the drip tray 12; because of the inclination of the bottom 12b of the drip tray 12, the liquid contained in the latter flows, by gravity, towards the opened rear end 12a of the drip tray 12, traverses the latter, and falls on the bottom of the housing, not illustrated, of the drawer 1, from which it finally goes into the tub, also not illustrated of the washing machine.

[0076] Advantageously, the method according to the invention is as well applicable, by using a suitable mould, for producing a drawer, not illustrated, provided with more than one compartments having one or more openings on their bottom, and with associated more than one drip trays which can be rotated and fixed to the bottom of each compartments, in such a way to be placed underneath the one or more openings obtained in the bottom of each compartments.

[0077] The method according to the invention is moreover applicable for producing a drawer, not illustrated, provided with more than one compartments having one or more openings on their bottom, and with associated a single drip tray which can be rotated and fixed to the bottom of the drawer in such a way to be placed underneath all the openings obtained in the bottom of the compartments.

[0078] The drawer 1 obtained by the method according to the invention can be used in a washing machine substantially in the same way as the prior-art drawer 107 described with reference to Figures 1 to 7.

[0079] It is seen therefore how the invention achieves the proposed aim and objects, there being provided a method for the production of a drawer for the load of washing and/or rinsing products, particularly for a wash-

ing machine, which, by moulding the drawer and the drip tray in a reciprocal position which allows avoiding the usage of a sliding lateral punch which could generate wear and tear, and therefore backlashes, in correspondence of the port of the one or more openings fluidly connecting the drip tray and the compartment adapted to be filled with washing and/or rinsing products, ensures the optimal passage of liquid from the drawer to the tub of a washing machine.

[0080] Moreover, the method according to the invention allows to obtain the drawer without substantially increasing the costs and the time needed for its production respect to the prior art.

Claims

1. Method for the production of a drawer (1) for the load of washing and/or rinsing products, particularly for a washing machine, said drawer (1) comprising at least one compartment (3) with one or more openings (5) on its bottom (4), and a tube (6) protruding from the border of each opening (5), **characterized in that** it comprises at least the following steps:

   a) injecting a liquefied plastic material in a mould (2) adapted to obtain said drawer (1) and a drip tray (12) connected to said drawer (1) by a connecting element (13) forming a single-piece construction with said drawer (1) and said drip tray (12);
   b) after the solidification of said plastic material, opening said mould (2) and extracting said drawer (1) and said drip tray (12);
   c) rotating said drip tray (12) towards the bottom (4) of said compartment (3), and contemporaneously folding said connecting element (13), until positioning said drip tray (12) underneath said one or more openings (5);
   d) associating said drip tray (12) to the bottom (4) of said at least one compartment (3).

2. Method, according to claim 1, **characterised in that** after the extraction from said mould (2) and before the rotation of said drip tray (12), said drip tray (12) isn't positioned below said one or more openings (5) of said compartment (3).

3. Method, according to claim 2, wherein said compartment (3) has an elongated shape extending substantially along a longitudinal axis (20) connecting a frontal end (1a) and a rear end (1b) of said drawer (1), **characterised in that** after the extraction from said mould (2) and before the rotation of said drip tray (12), said drawer (1) and said drip tray (12) are substantially reciprocally aligned along an axis substantially parallel to said longitudinal axis (20).

4. Method, according to claim 2 or 3, **characterised in that** after the extraction from said mould (2) and before the rotation of said drip tray (12), said connecting element (13) is connected to a rear end (12a) of said drip tray (12), and to a rear end (1b) of said drawer (1).

5. Method, according to one or more of the previous claims, **characterised in that** the association of said drip tray (12) to the bottom (4) of said compartment (3) is obtained by the coupling of first (14) and second (15) fastening means provided respectively on/at said drip tray (12) and on/at said bottom (4), during the injection moulding of said drawer (1) and drip tray (12), by a suitable conformation of said mould (2).

6. Method, according to claim 5, **characterised in that** the association of said drip tray (12) to the bottom (4) of said compartment (3) is obtained by the snap fittings of said first (14) and second (15) fastening means.

7. Method, according to claim 6, **characterised in that** the association of said drip tray (12) to the bottom (4) of said compartment (3) is obtained by the snap fitting of a plurality of pawls (14), protruding from the lateral surface of said drip tray (12), with a plurality of seats (15) obtained in the bottom (4) of said compartment (3).

8. Method, according to claim 6, **characterised in that** the association of said drip tray (12) to the bottom (4) of said compartment (3) is obtained by the snap fitting of a plurality of pawls, protruding from the bottom (4) of said compartment (3), with a plurality of seats (15) obtained in said drip tray (12).

9. Method, according to claim 1 or 2 or 3 or 4, **characterised in that** the association of said drip tray (12) to the bottom (4) of said compartment (3) is obtained by welding, and/or by glueing, and/or by restraining, and/or by interfering fit.

10. Method, according to one or more of the previous claims, **characterised in that** the injection of said liquefied plastic material is performed in a mould (2) comprising at least an upper punch (7) and a lower punch (8), adapted to be assembled together so as to define one or more cavities (9) shaped as said one or more tubes (6) and the corresponding openings (5), said upper punch (7) comprising, in correspondence of each tube (6), a central region (7a), substantially cylindrical or conical, or prismatic, defining the internal surface of said tube (6) and the corresponding opening (5), said central region (7a) protruding from the bottom surface (7b) of said upper punch (7), so as to enter, when said upper and lower

punches are assembled together, in a corresponding seat (10) obtained in said lower punch (8).

11. Washing machine comprising a drawer (1) containing at least one compartment (3), for the load of washing and/or rinsing products, with one or more openings (5) on its bottom (4) and a tube (6) protruding from the border of each opening (5), a drip tray (12) being positioned underneath said one or more openings (5), **characterised by** comprising a connecting element (13) forming a single-piece construction with said drawer (1) and said drip tray (12), said connecting element (13) connecting the rear end (1b) of said drawer (1) and the rear end (12a) of said drip tray (12), said washing machine (1) comprising coupling means, adapted to connect said drip tray (12) to said bottom (4) of said compartment (3).

12. Washing machine, according to claim 11, **characterised in that** said coupling means comprise first (14) and second (15) fastening means obtained respectively on/at said drip tray (12) and on/at said bottom (4) of said compartment (3).

13. Washing machine, according to claim 11 or 12, **characterised in that** said coupling means comprises glueing and/or welding and/or restraining and/or interfering fit.

14. Washing machine comprising a drawer (1) obtained by the method according to one or more of claims 1 to 10.

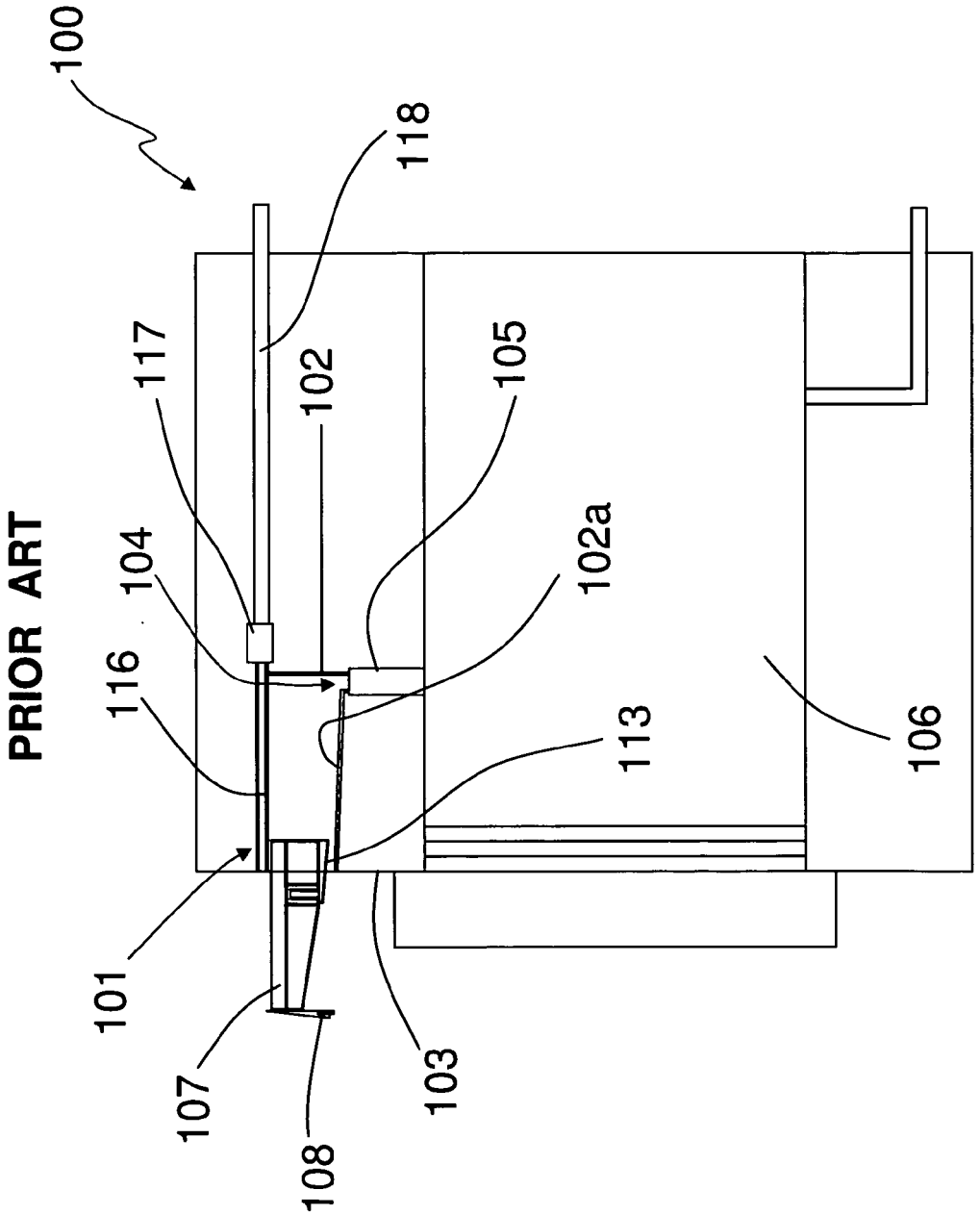
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Fig. 1

PRIOR ART

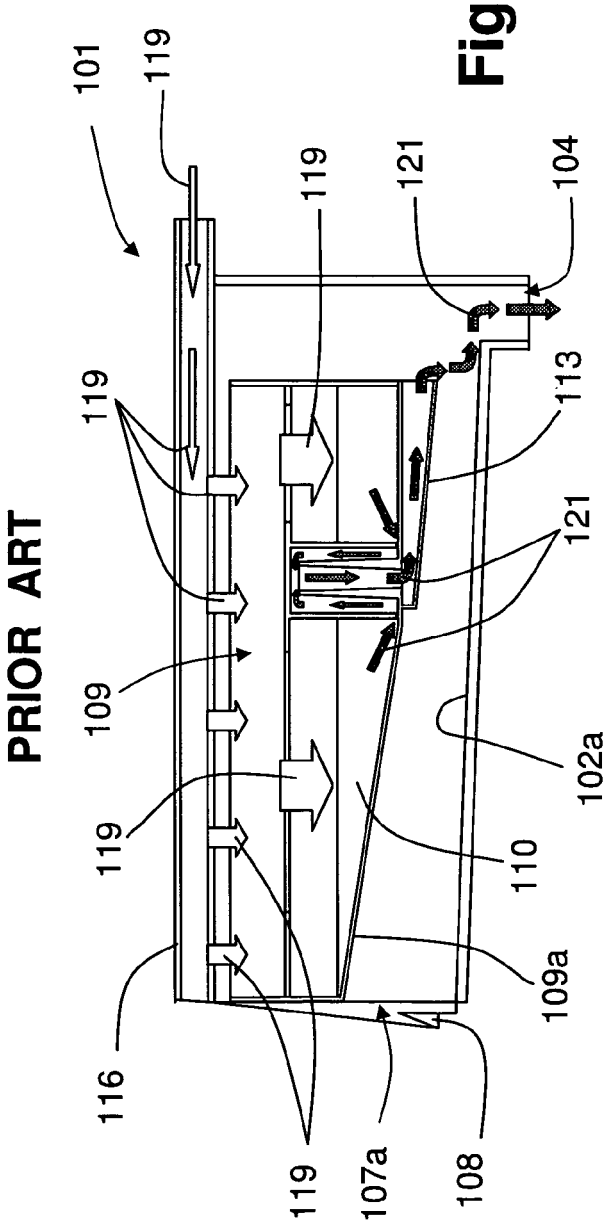

Fig. 2

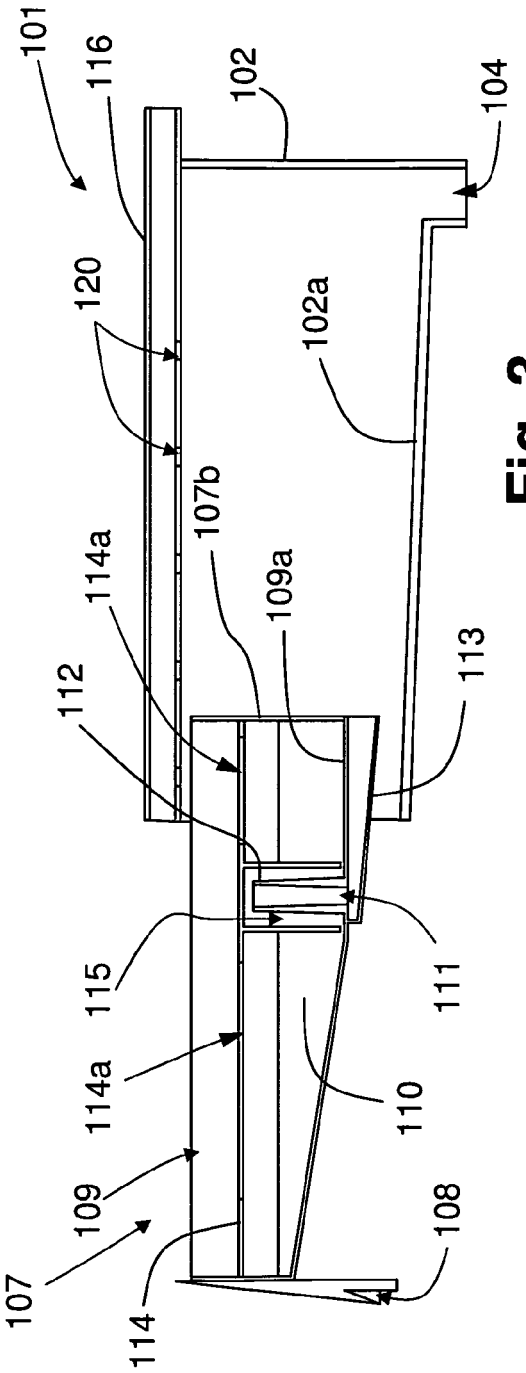

Fig. 3

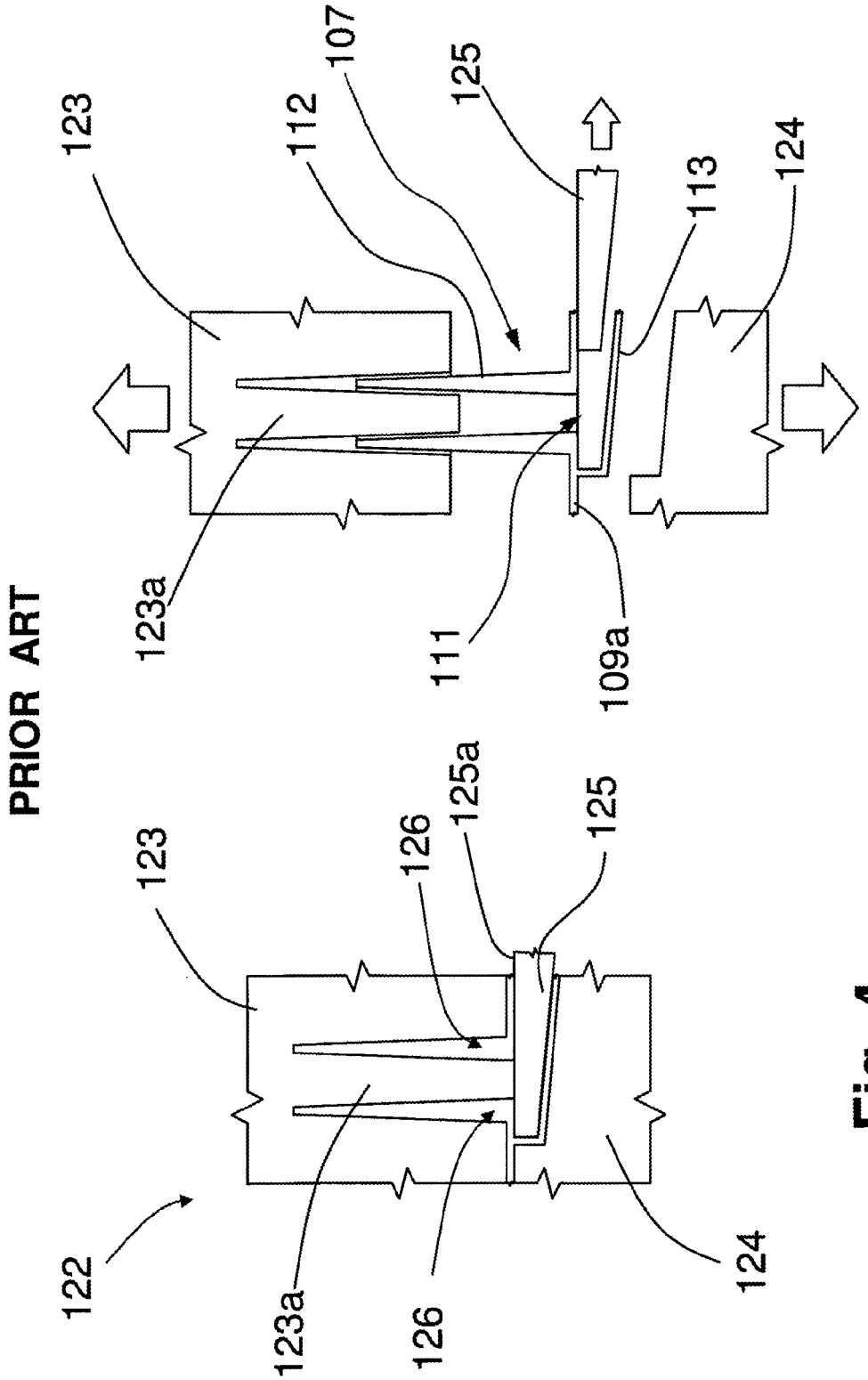
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Fig. 4

Fig. 5

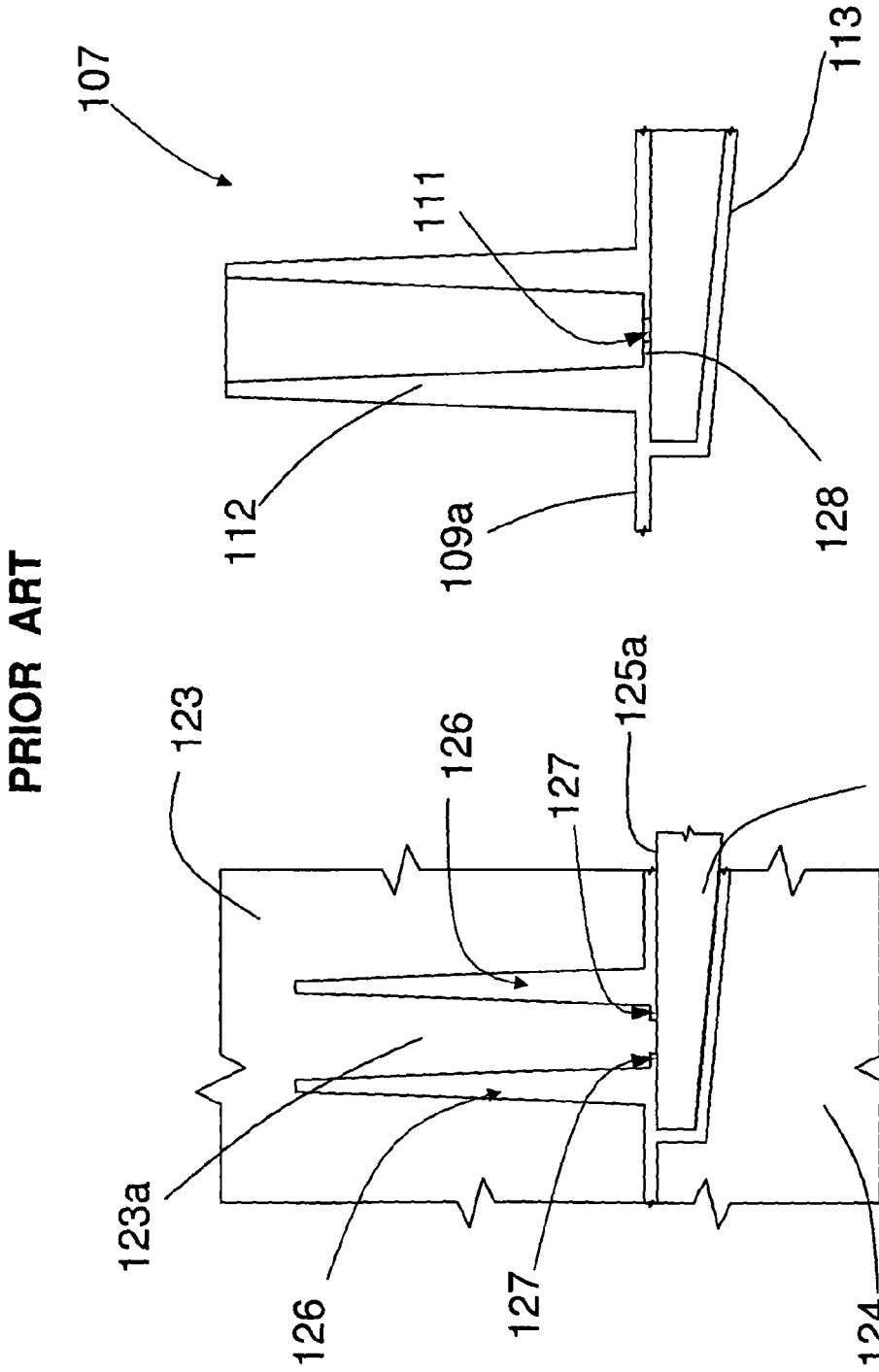
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Fig. 6

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Fig. 7

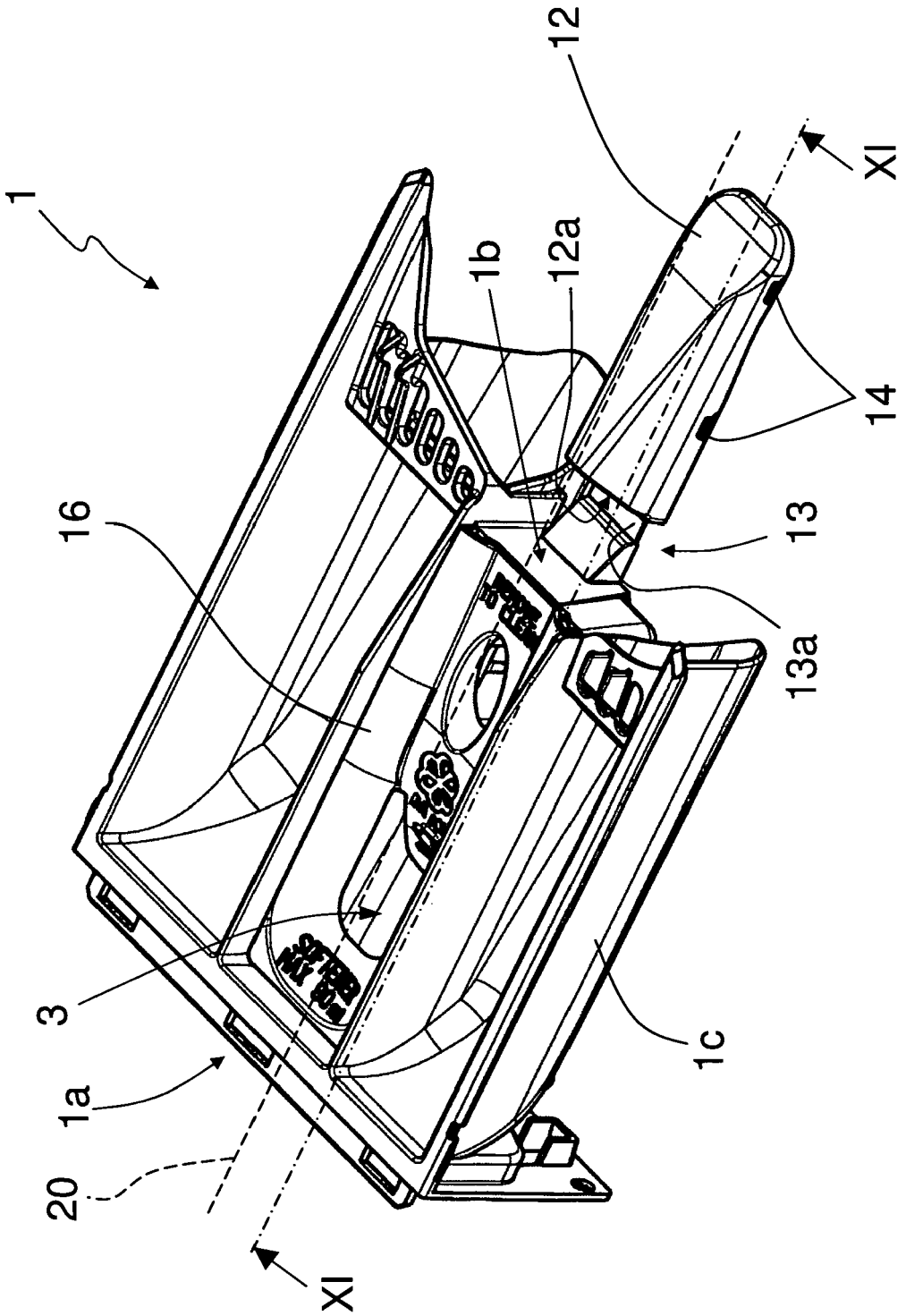

Fig. 8

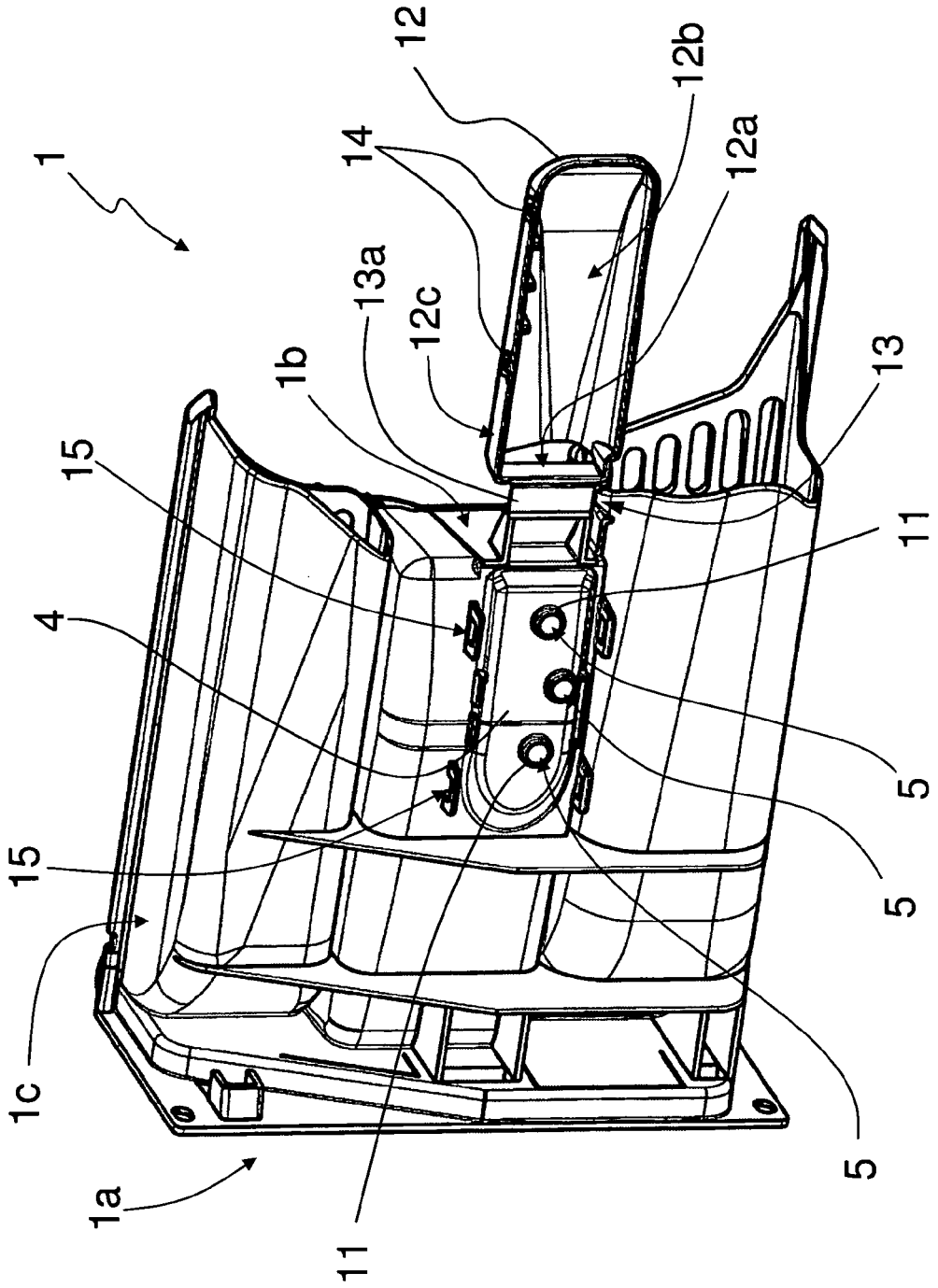

Fig. 9

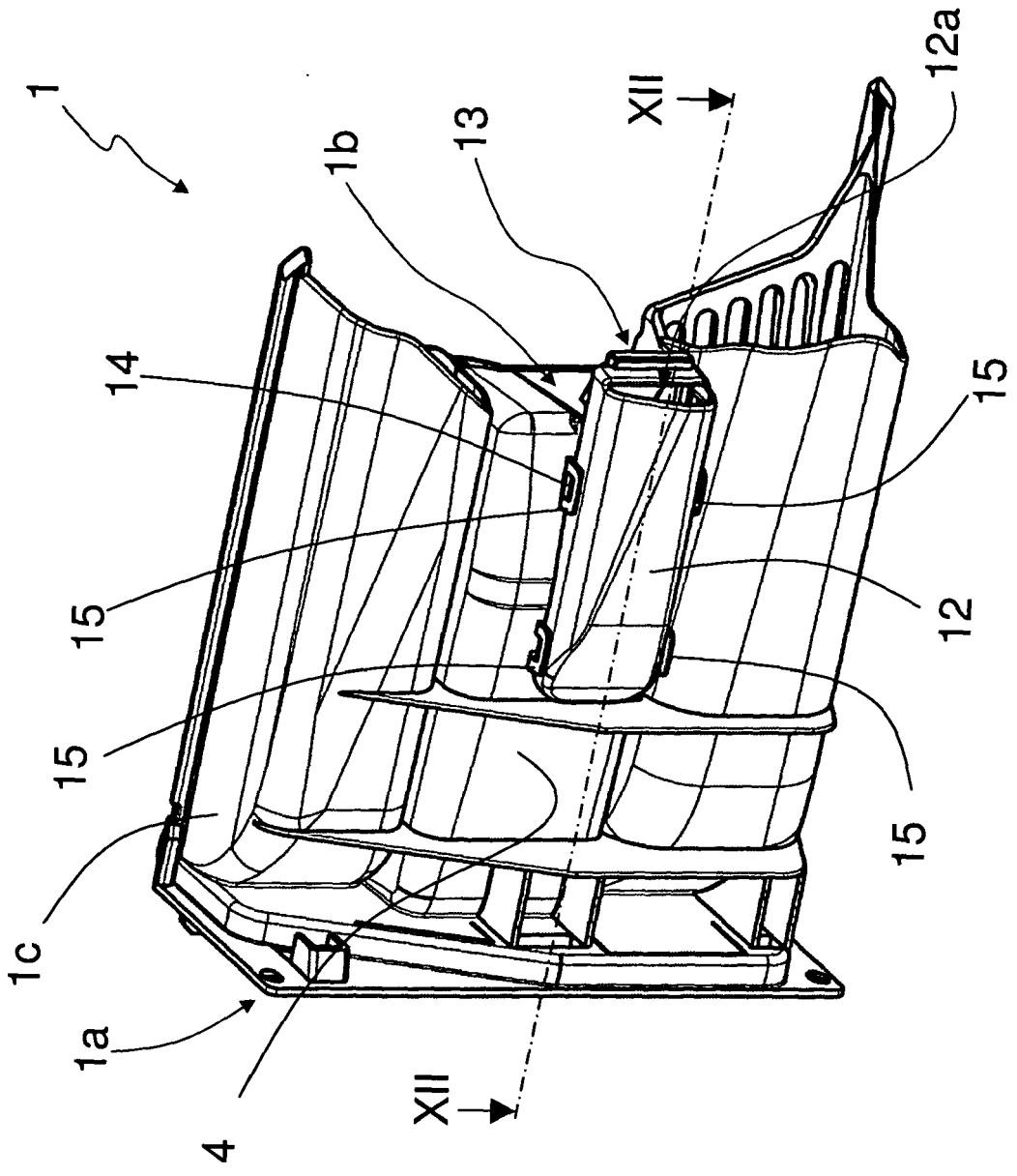

Fig. 10

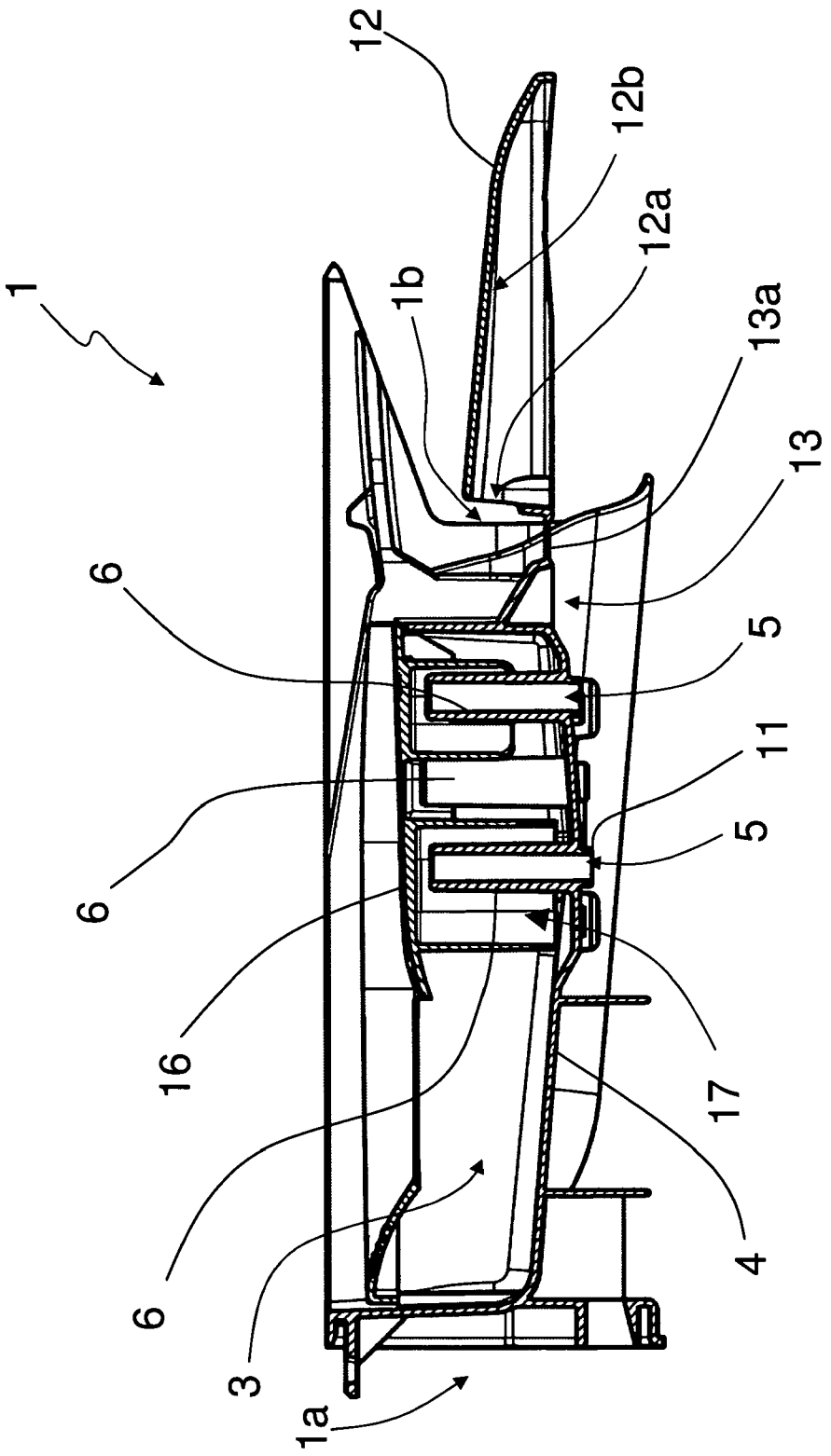

Fig. 11

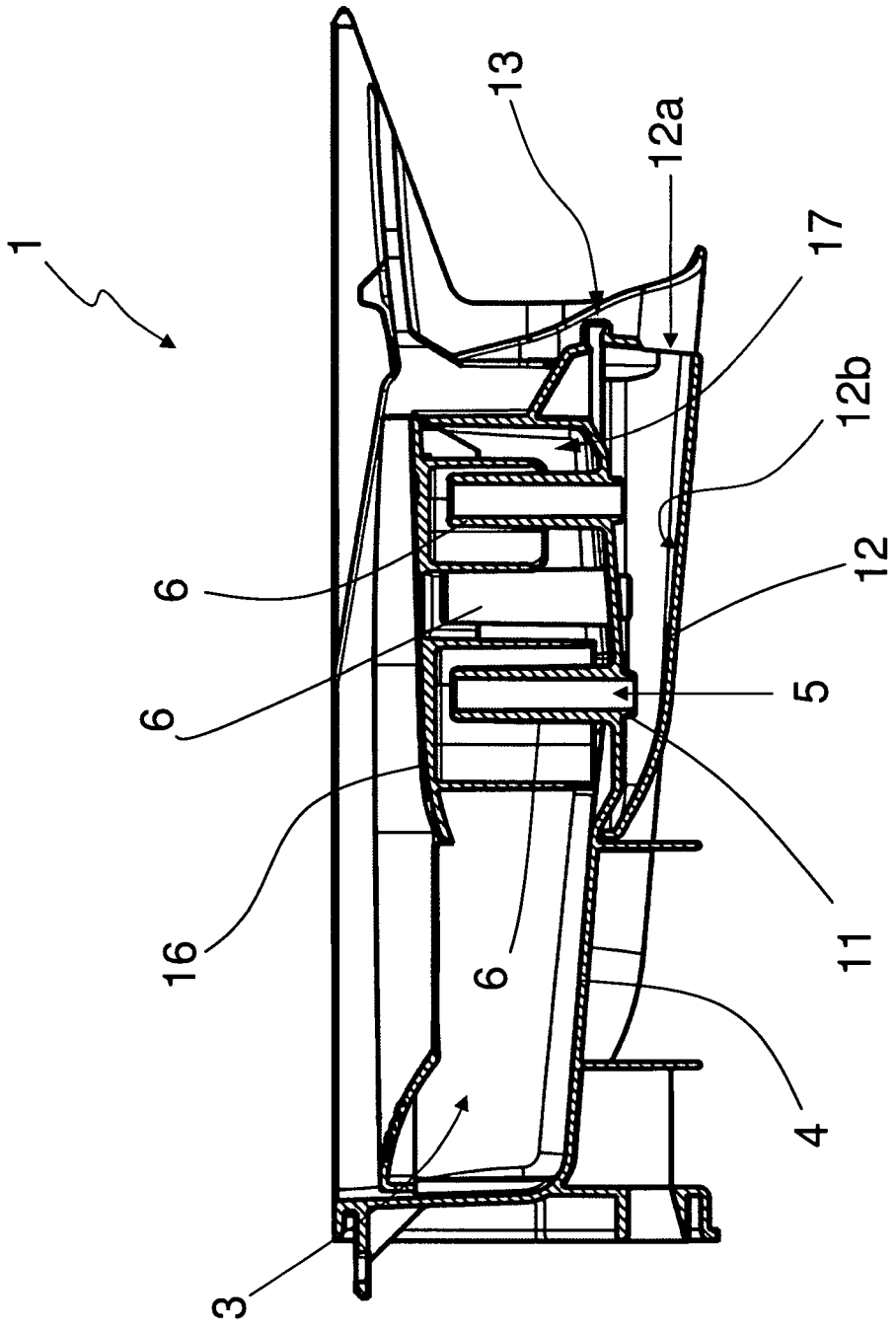

Fig. 12

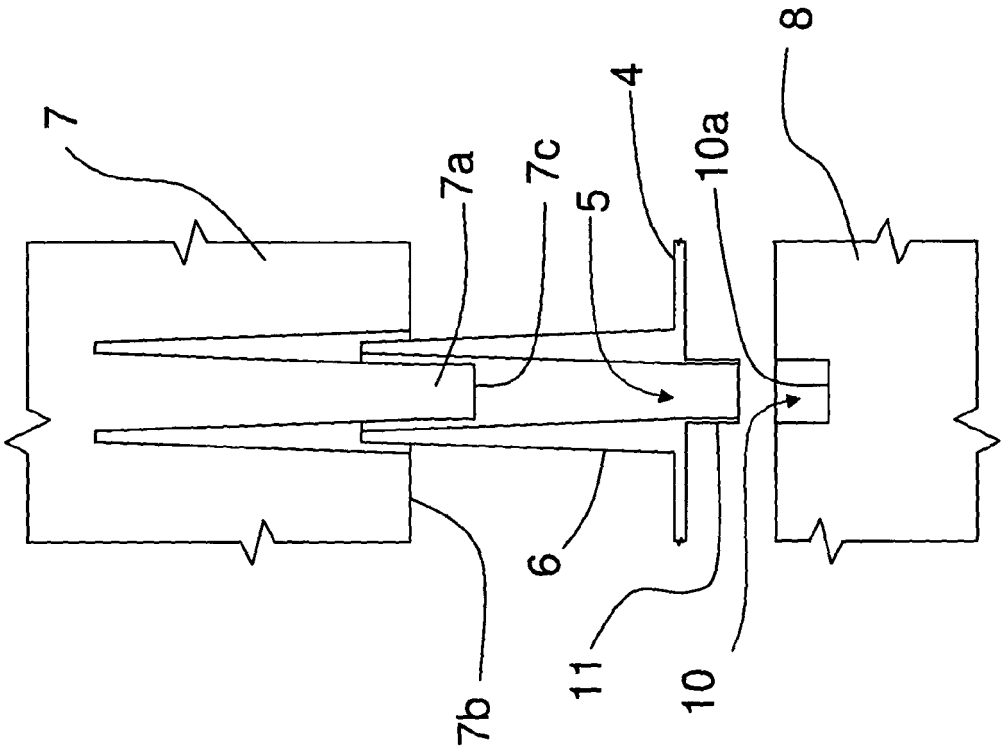

Fig. 14

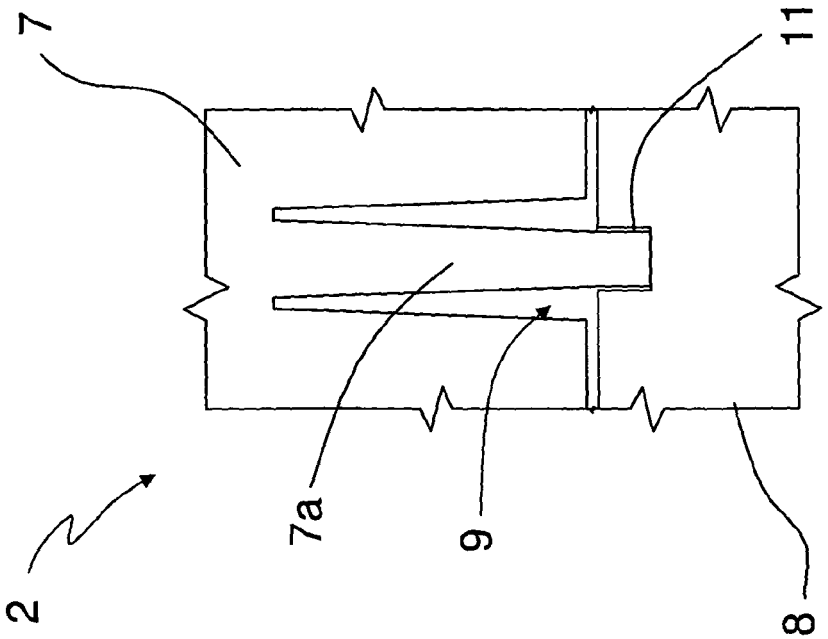

Fig. 13

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EUROPEAN SEARCH REPORT

Application Number
EP 09 00 5225

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2006 029661 A1 (LG ELECTRONICS INC [KR]) 1 February 2007 (2007-02-01)	11	INV. D06F39/02
A	* figure 9 *	1	
A	DE 32 15 501 A1 (BOSCH SIEMENS HAUSGERAETE [DE]) 3 November 1983 (1983-11-03) * figures 1,3 *	1,11	
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TECHNICAL FIELDS SEARCHED (IPC)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 August 2009	Kising, Axel

CATEGORY OF CITED DOCUMENTS

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L : document cited for other reasons

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27-08-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82